Avoiding Environmental Triggers

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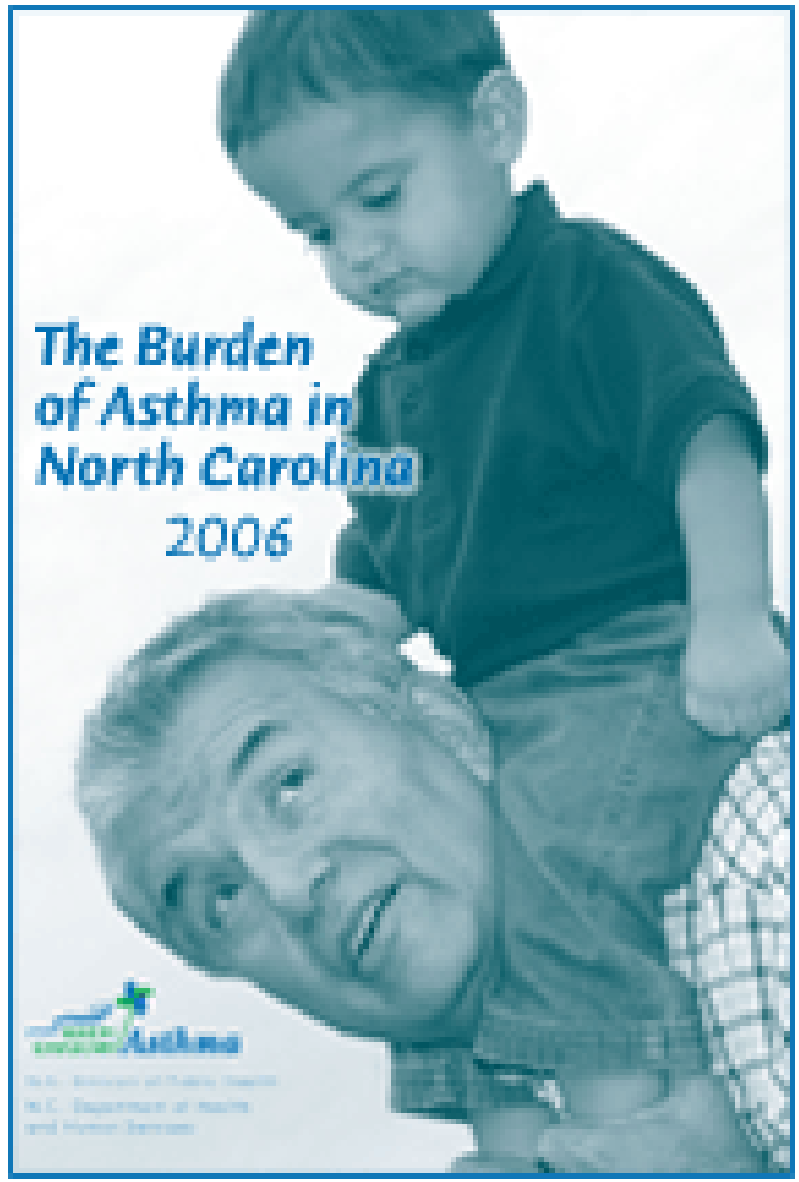
Asthma Summit
April 17, 2007

The Burden of Asthma in North Carolina, 2006

- ***Adults*** In 2005, 10.1% of adults (age ≥18 years) in North Carolina reported ever having been told by a health care provider that they have asthma.
- ***Children*** In 2005, 17.8% of children (age ≤ 17 years) in North Carolina reported ever having been told by a health care provider that they have asthma. Of those children, 11.5% report that they still currently have asthma.



http://www.asthma.ncdhhs.gov/ncapBurdenReport.htm

The North Carolina Asthma Plan

- **Asthma is a Public Health Priority**
- **Burden of Asthma in North Carolina**
- **The Planning Process**
- **Our Partners**
- **The Strategic Plan**
  - o Education and Public Awareness
  - o Health Disparities
  - o Medical Management
  - o Surveillance
  - o Environmental
- **How We Will Sustain North Carolina's Asthma Initiatives**

http://www.aaaai.org/members/resources/initiatives/pediatricasthma.stm

PEDIATRIC ASTHMA

Promoting Best Practice

Guide for Managing Asthma in Children

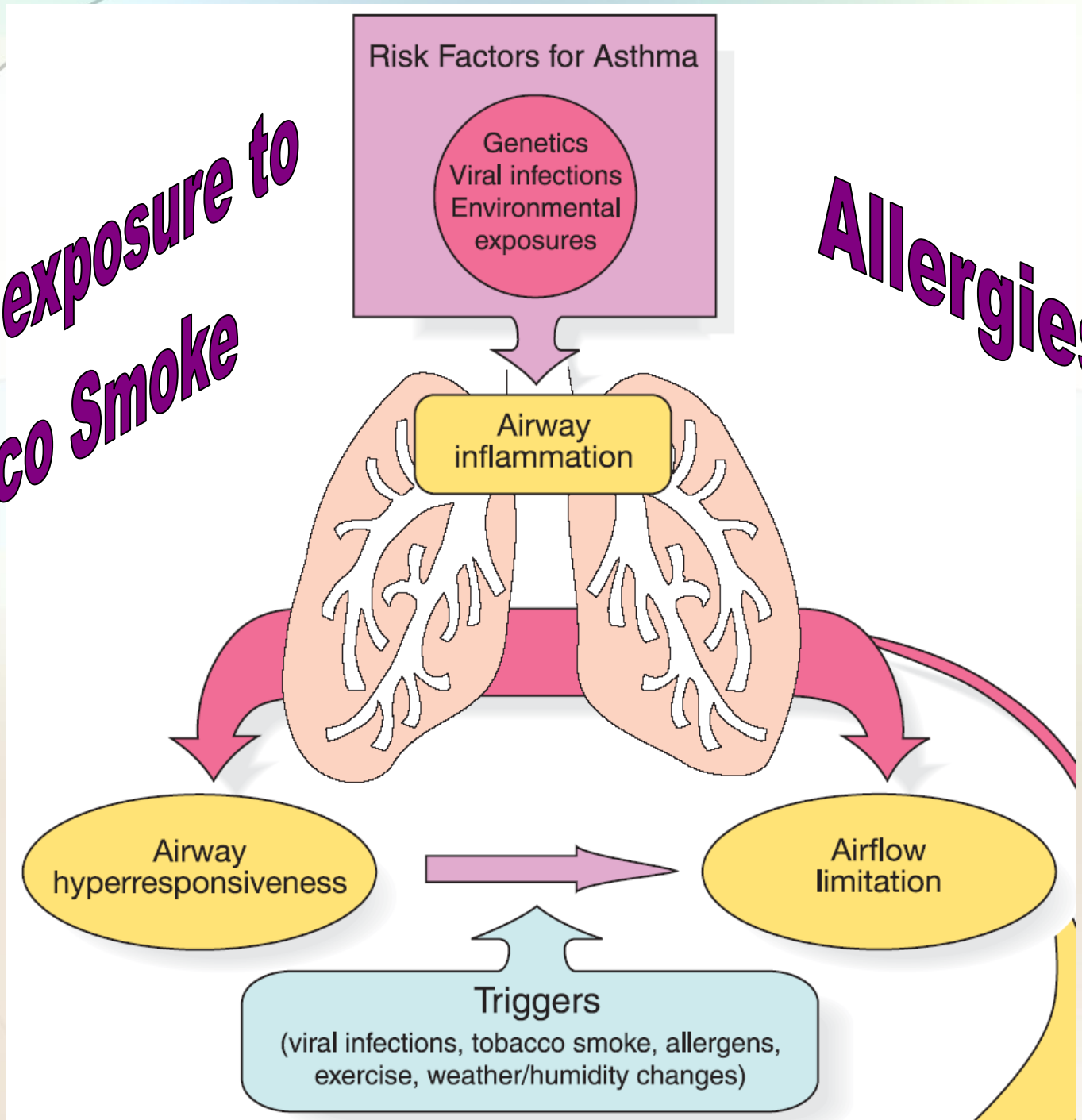
AMERICAN ACADEMY OF ALLERGY ASTHMA & IMMUNOLOGY

National Asthma Education and Prevention Program

American Academy of Pediatrics

Perinatal exposure to Tobacco Smoke

Allergies



Risk Factors for Development of Asthma: Environmental

Clearing the Air:
Asthma and Indoor Air Exposures

http://www.iom.edu (Publications)
Institute of Medicine, 2000
Committee on the Assessment of Asthma and Indoor Air

Review of current evidence regarding indoor air exposures and asthma

Clearing the Air

Categories for Associations of Various Elements

- **Sufficient evidence of a causal relationship**
- **Sufficient evidence of an association**
- **Limited or suggested evidence of an association**
- **Inadequate or insufficient evidence to determine whether an association exists**
- **Limited or suggestive evidence of no association**

Clearing the Air

Indoor Air Exposures and *Asthma Development*

Biological Agents

- Sufficient evidence of a causal relationship
  - House dust mite
- Sufficient evidence of an association
  - None found
- Limited or suggestive evidence of an association
  - Cockroach (in preschool-aged children)
  - Respiratory syncytial virus (RSV)

Chemical Agents

- Sufficient evidence of a causal relationship
  - None found
- Sufficient evidence of an association
  - Environmental tobacco smoke (in preschool-aged children)
- Limited or suggestive evidence of an association
  - None found

Clearing the Air

Indoor Air Exposures and *Asthma Exacerbation*

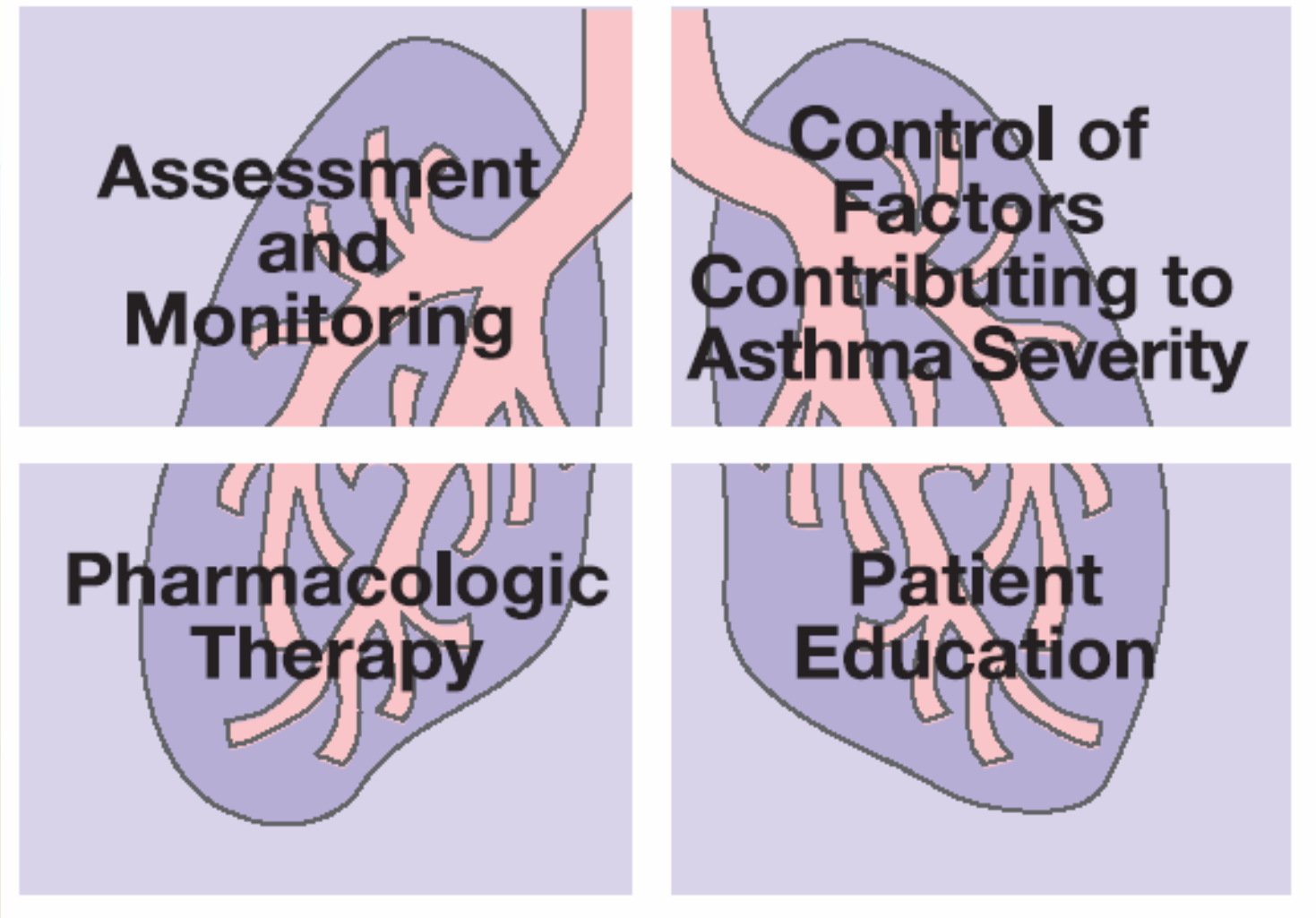
Biological Agents

- Sufficient evidence of a causal relationship
  - Cat
  - Cockroach
  - House dust mite
- Sufficient evidence of an association
  - Dog
  - Fungi/Molds
  - Rhinovirus
- Limited or Suggestive Evidence of an Association
  - Domestic birds
  - Chlamydia and Mycoplasma pneumoniae
  - RSV

Chemical Agents

- Sufficient evidence of a causal relationship
  - Environmental tobacco smoke (in preschool-aged children)
- Sufficient evidence of an association
  - NO_2, NO_x (high levels)
- Limited or suggestive evidence of an association
  - Environmental tobacco smoke (school-aged, older children and adults)
  - Formaldehyde
  - Fragrances

Components of Successful Asthma Management



Asthma Therapy Goals

- Prevent chronic and troublesome symptoms.
- Prevent exacerbations of symptoms.
- Maintain normal activity levels.
- Maintain normal pulmonary function.
- Optimize pharmacotherapy, minimize side effects.
- Satisfy the child's and the family's expectations/goals for asthma care.

Asthma Control in Children

- No coughing
- No difficulty breathing
- No waking up at night
- Normal activities
- No acute episodes
- No absences
- No missed time from work or other activities for the parent or caregiver
- Increased need for short acting inhaled beta-agonists (SAIBA):
  - Using SAIBA more than 2 times a week
  - Using SAIBA medication on a daily basis
  - Using more than 1 SAIBA canister a month

Assess Reasons for Poor Asthma Control- ICE

- Inhaler technique- assess patient's inhaler technique
- Compliance- assess how often and how much medication the patient is taking
- Environment- determine if something in patient's environment has changed
- Assess for presence of an alternative diagnosis

Control of Factors Contributing to Asthma Severity

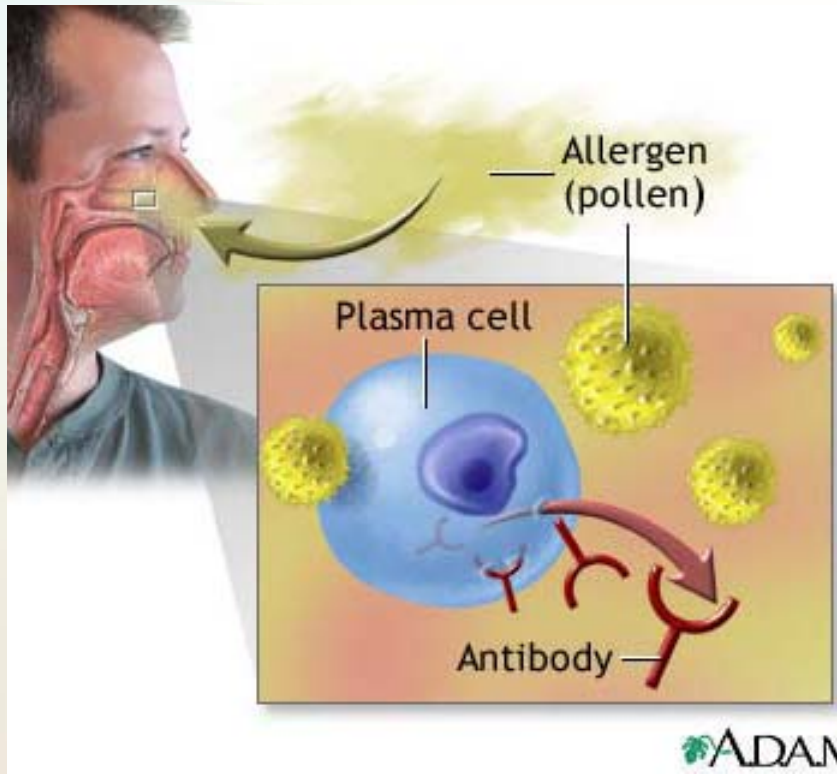
- Avoiding or controlling factors that contribute to asthma severity will reduce symptoms and the need for medications
  - Identify the specific allergens to which patient is exposed
  - Determine and confirm sensitivity to the allergens
  - Obtain agreement with the patient to initiate one or two simple control measures
  - Follow up with patient, adding control measures after first ones are implemented

Allergies

- Most children with asthma are allergic
- Allergy testing is recommended for children with persistent asthma who are exposed to perennial indoor allergens
- Allergy testing is helpful for diagnosing contributing allergic factors

Allergen Immunotherapy Consider when

- There is clear evidence of a relationship between symptoms and exposure.
- Symptoms occur all year or during a major portion of the year.
- There is difficulty controlling symptoms with pharmacologic management.



Home Assessment

- **http://www.epa.gov/asthma/pdfs/home_environment_checklist.pdf**

Dust Mites

Triggers: Body parts and droppings.

Where Found: Highest levels found in mattresses and bedding. Also found in carpeting, curtains and draperies, upholstered furniture, and stuffed toys. Dust mites are too small to be seen with the naked eye and are found in almost every home.

Pests (such as cockroaches and rodents)

Triggers: Cockroaches – Body parts, secretions, and droppings.
Rodents – Hair, skin flakes, urine, and saliva.

Where Found: Often found in areas with food and water such as kitchens, bathrooms, and basements.

Warm-Blooded Pets (such as cats and dogs)

Triggers: Skin flakes, urine, and saliva.

Where Found: Throughout entire house, if allowed inside.

Mold

Triggers: Mold and mold spores which may begin growing indoors when they land on damp or wet surfaces.

Where Found: Often found in areas with excess moisture such as kitchens, bathrooms, and basements. There are many types of mold and they can be found in any climate.

Secondhand Smoke

Trigger: Secondhand smoke – Mixture of smoke from the burning end of a cigarette, pipe or cigar and the smoke exhaled by a smoker.

Where Found: Home or car where smoking is allowed.

Nitrogen Dioxide (combustion by-product)

Trigger: Nitrogen dioxide – An odorless gas that can irritate your eyes, nose, and throat and may cause shortness of breath.

Where Found: Associated with gas cooking appliances, fireplaces, woodstoves, and unvented kerosene and gas space heaters.

Questions	Answers	Action Steps
HOME INTERIOR (continued)		▲ MAY REQUIRE ADDITIONAL TIME AND/OR RESOURCES.
Does the heating system use a fuel-burning appliance (such as an oil or gas furnace)? *Notes:*	☐ Y ☐ N	▲ Have the heating system - including furnaces, flues and chimneys - professionally inspected annually. ▲ Promptly repair cracks or damaged parts.
Are supplemental heating sources used? (Check all that apply) *Notes:*	☐ Fireplace ☐ Wood-burning stove ☐ Unvented kerosene or gas space heater ☐ Other_____	■ Properly ventilate the room where a fuel-burning appliance is used. Consider using appliances that vent to the outside whenever possible. ■ Never use a gas-cooking appliance as a heating source. ■ If using a fireplace, make sure it is properly vented to help ensure smoke escapes through the chimney. ■ If using a wood-burning stove, make sure that doors are tight-fitting. Use aged or cured wood only and follow the manufacturer's instructions for starting, stoking, and putting out the fire. ■ If using an unvented kerosene or gas space heater, follow the manufacturer's instructions for proper fuel to use and keep the heater properly adjusted.
Are there air conditioning window units? *Notes:*	☐ Y ☐ N	■ Run window air conditioner with the vent control open to increase the outdoor ventilation rate during the cooling season.
Are gas cooking appliances used?	☐ Y ☐ N	■ When cooking with a gas appliance, turn on an exhaust fan or open a window. ■ Avoid misuse of the appliance by following the manufacturer's instructions for operation.

Trigger: Smoke

- Permit no smoking around the child or in the child's home.
- Help parents and caregivers stop smoking.

- Eliminate use of wood stoves and fireplaces.

Bedding and Sleeping Arrangements

What does the patient sleep on? (Check all that apply)	☐ Mattress with box springs ☐ Sofa ☐ Other_____	▲ Cover patient's mattress in a dust-proof (allergen impermeable) zippered cover. Clean cover according to manufacturer's instructions. ■ If it is necessary for the patient to sleep on upholstered furniture such as a sofa, then cover furniture with washable slipcovers or sheets and vacuum furniture regularly (including removing cushions and vacuuming in cracks and crevices).

Notes:

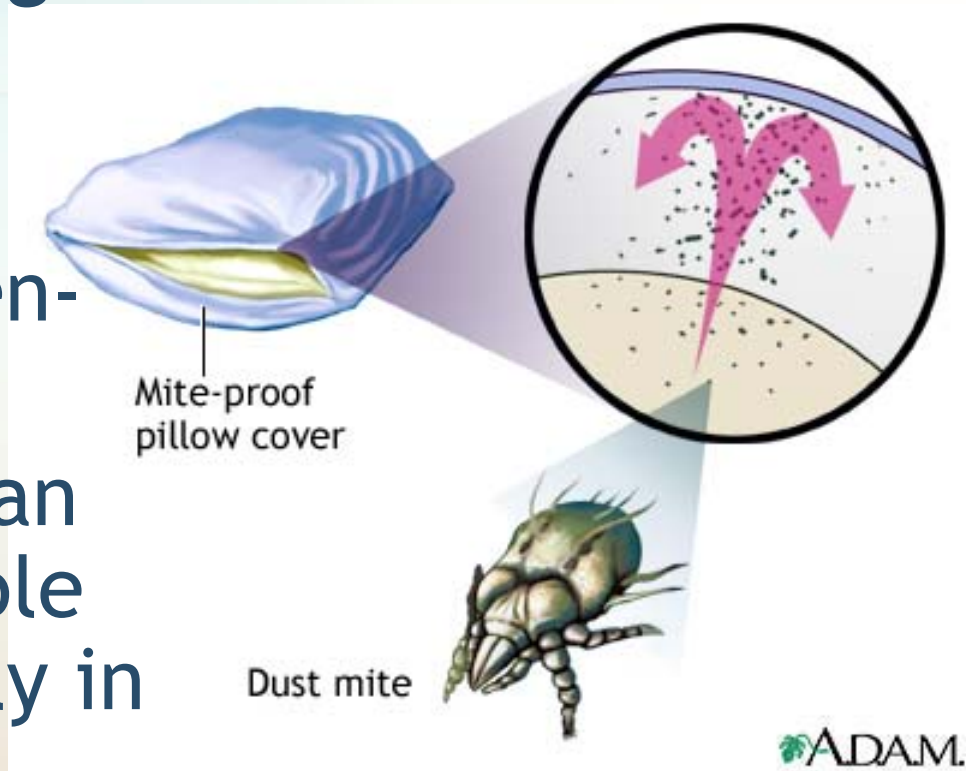
What types of bedding does the patient use? (Check all that apply)	☐ Bedspread (e.g., comforter, quilt) ☐ Blankets ☐ Pillows ☐ Sheets ☐ Other (e.g., sleeping bag)	■ Choose washable bedding. ■ Wash bedding regularly in hot water and dry completely. ▲ Cover patient's pillow in a dust-proof (allergen impermeable) zippered cover. Clean cover according to manufacturer's instructions.

Flooring

What type of floor covering is present? (Check all that apply)	☐ Carpeting ☐ Hardwood floor, tile, or vinyl flooring ☐ Throw rugs ☐ Other_____	■ If carpeting is present, vacuum carpets, area rugs, and floors regularly. ■ If possible, use a vacuum cleaner with a high efficiency filter. ■ Mop hard surface floors regularly. ■ Wash throw rugs regularly in hot water. Dry completely. ■ Clean baseboards regularly using a damp cloth with warm, soapy water. ■ Someone besides the patient should vacuum, sweep, empty the dust canister and change the vacuum bag. ■ If possible, the patient should stay out of rooms when they are being vacuumed or swept. ■ If the patient vacuums, sweeps, empties the dust canister, or changes the vacuum bag, he or she should wear a dust mask.

Trigger: Dust Mites
Essential Actions

- Encase the child's mattress and box springs in an allergen-impermeable cover.
- Cover the pillow in an allergen-impermeable case, or wash weekly in hot water.*

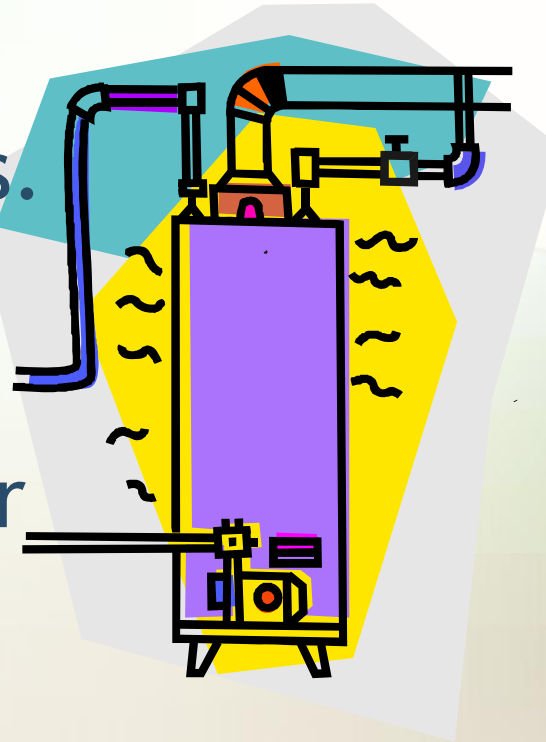


Trigger: Dust Mites
Desirable Actions

- Remove carpets from the bedroom, and carpets in other rooms that are laid on cement.
- Avoid sleeping or lying on upholstered furniture.
- Minimize stuffed toys in the child's bedroom.
- Reduce indoor humidity to < 50%.
- Wash stuffed toys weekly in hot water.*

* Hot Water

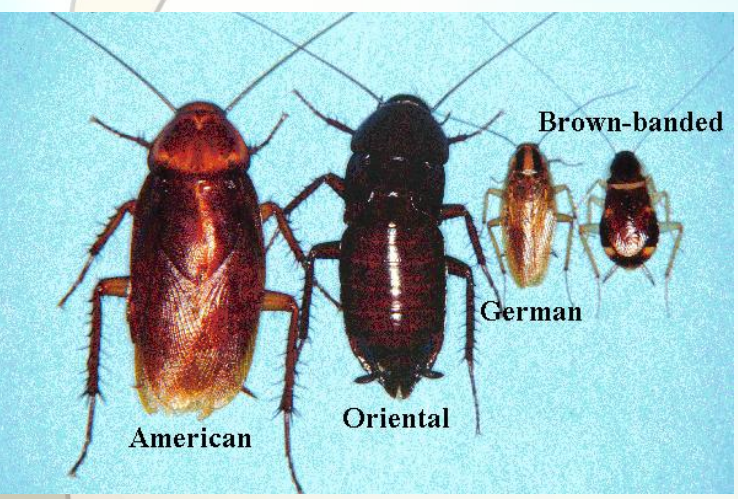
*Water temperatures ≥ 130° F are necessary to kill dust mites. However, for the safety of young children, the American Academy of Pediatrics recommends maintaining water temperatures under 120° F. If possible, it is recommended to raise the water temperature when bedding is being laundered.



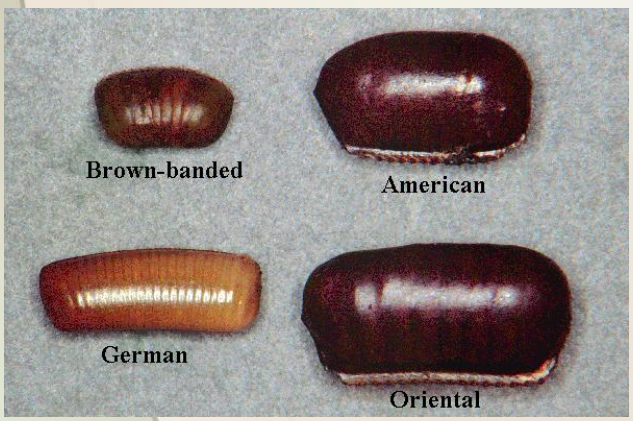
Pest Control

Is there evidence of cockroaches and/or rodents (such as droppings or dead specimens in traps)? *Notes:*	☐ Y ☐ N	■ Clean all surfaces where you have seen pests. ■ Use poison baits, boric acid, or traps to kill pests. Minimize use of sprays. If sprays are used: limit the spray to the infested area, carefully follow the instructions on the label, make sure there is plenty of fresh air where the spray is being used and, if possible, keep patient out of the room.
Are there food crumbs or open or unsealed food? *Notes:*	☐ Y ☐ N	■ Clean all food crumbs or spilled liquids right away. ■ Store food in sealed containers. ■ Remove food, bags, newspapers, and empty boxes, cans, and bottles from the sleeping area. ■ Put all garbage in plastic trash bags. Seal trash bags and put them into garbage cans with fitted lids every day.
Are there holes or gaps between construction materials and pipes that could allow pests to enter the house? *Notes:*	☐ Y ☐ N	■ Seal holes or gaps between construction materials and pipes, or ask the owner to do so.
Is there evidence of standing water or leaks? *Notes:*	☐ Y ☐ N	■ Dry damp or wet items within 24-48 hours to avoid mold growth. ■ Avoid standing water in house plant containers and drip pans. ▲ Fix water leaks (such as leaky plumbing) as soon as possible.

Trigger: Cockroach Allergens



- Do not leave food or garbage exposed.
- Reduce the indoor humidity to < 50%.
- Fix leaky faucets, pipes.
- Use boric acid traps. (Avoid using poison around very young children.)



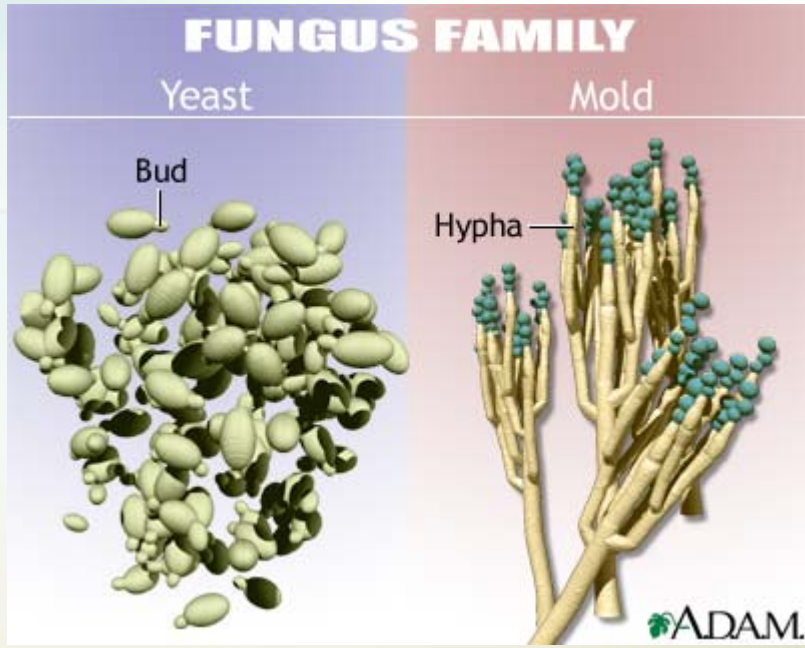
Moisture Control

Is there evidence of water damage, moisture, or leaks (such as damp carpet or leaky plumbing)? *Notes:*	☐ Y ☐ N	■ Dry damp or wet items within 24-48 hours to avoid mold growth. ▲ Fix water leaks (such as leaky plumbing) as soon as possible. ▲ Replace absorbent materials, such as ceiling tiles and carpet, if mold is present. ▲ Use air conditioner or dehumidifier to maintain low indoor humidity. If possible, keep indoor humidity below 60% (ideally between 30-50%) relative humidity.
Do you see or smell mold or mildew (such as in the bathroom on tub, shower, walls, or windows)? *Notes:*	☐ Y ☐ N	■ Open a window or turn on an exhaust fan when there is excessive moisture in the room, such as when showering or cooking. ■ Scrub mold off hard surfaces with detergent and water. Dry completely. ■ Clean up mold and dry surfaces completely before painting or caulking. ▲ Replace absorbent materials, such as ceiling tiles and carpet, if mold is present.
Is standing water present (such as in refrigerator drip pans, air conditioner drip pans, or house plants)? *Notes:*	☐ Y ☐ N	■ Empty and clean refrigerator and air conditioner drip pans regularly. ■ Avoid standing water in plant containers.

Are humidifiers used in the patient's house? *Notes:*	☐ Y ☐ N	■ Use humidifier only when conditions require it, use the correct setting to maintain indoor relative humidity between 30-50 percent, and clean humidifier reservoirs regularly. ■ Use low mineral content water to prevent the build-up of scale and dispersal of minerals into the air. ■ Follow manufacturer's instructions for use, maintenance, and replacement of any materials supplied with the humidifier.
Are rooms and moisture-producing appliances—such as stoves, clothes dryers, or dishwashers—properly vented (including venting to the outside if specified by the manufacturer)?	☐ Y ☐ N	■ Increase ventilation or air movement by opening doors and/or windows when practical. Use fans as needed. ■ Run the bathroom exhaust fan or open the window when showering. ■ Use exhaust fans or open windows whenever cooking or washing dishes. ■ Vent appliances properly according to manufacturer's specifications.
Is there evidence of standing water or leaks? *Notes:*	☐ Y ☐ N	■ Dry damp or wet items within 24-48 hours to avoid mold growth. ■ Avoid standing water in house plant containers and drip pans. ▲ Fix water leaks (such as leaky plumbing) as soon as possible.

Trigger: Indoor Mold

- Fix leaky faucets, pipes.
- Avoid vaporizers.
- Reduce indoor humidity to < 50%.

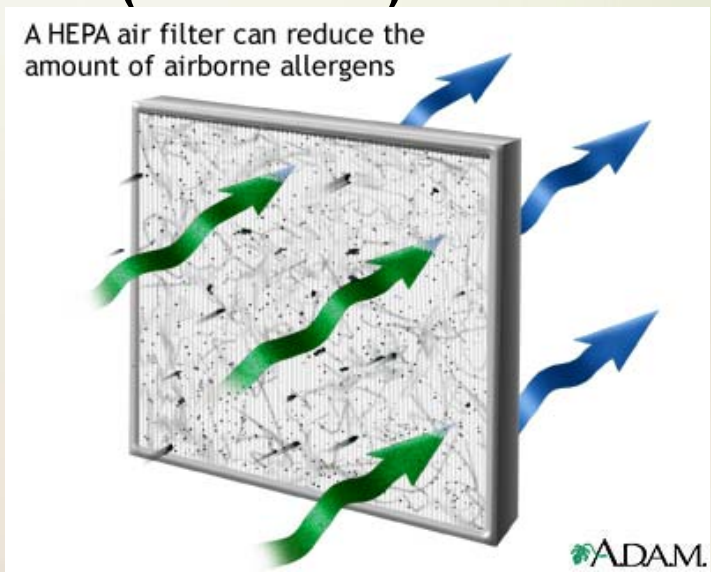


Indoor Humidity

- Controls at least three triggers
  - Dust mites
  - Cockroach allergens
  - Indoor mold
- Control methods

Air Cleaning

- Controls at least three triggers
  - Animal dander
  - Indoor mold
  - Tobacco smoke particulates (limited)
- Methods



Upholstered Furniture and Stuffed Toys

Is there upholstered furniture present?

☐ Y
☐ N

- Cover upholstered furniture with washable slipcovers or sheets.
- Vacuum upholstered furniture regularly, including removing cushions and vacuuming in cracks and crevices.
- ▲ If replacing furniture, consider purchasing a non-upholstered furniture - such as vinyl, wood, or leather - that can be easily wiped down.

Notes:

Are stuffed toys present?

☐ Y
☐ N

- Choose washable stuffed toys, and wash frequently in hot water. Dry completely.

Window Treatments

What window coverings are present? (Check all that apply)

☐ Curtains or drapes
☐ Blinds
☐ Shades
☐ Other_____

- Vacuum drapes regularly.
- Wash and dry curtains regularly.
- Dust window sills, blinds, and shades regularly using a damp cloth with warm, soapy water. Dry completely.
- ▲ If possible, replace curtains or drapes with plastic, vinyl, wood, or aluminum blinds.

Notes:

Trigger: Animal Dander

- Remove the pet from the home; also remove any products made from feathers. If removal of the animal is not acceptable then:
  - Keep the pet out of the child's bedroom and the bedroom door closed.
  - Keep the pet off upholstered furniture and carpets.
  - Wash the pet weekly to decrease the amount of dander, urine, and dried saliva.
- Use a filter on air ducts in child's room.

OUTDOOR AIR POLLUTION

Exposure to air pollution (mainly ozone and particle pollution) can trigger asthma attacks. The Air Quality Index (AQI) is a tool to provide the public with clear and timely information on local air quality and whether air pollution levels pose a possible health concern. The AQI is reported and forecasted every day in many areas throughout the U.S. on local weather reports and through national media. Asthma attacks are most likely to occur the day after outdoor pollution levels are high.

People can take simple steps to reduce their exposure to outdoor air pollution. When the AQI reports unhealthy levels:

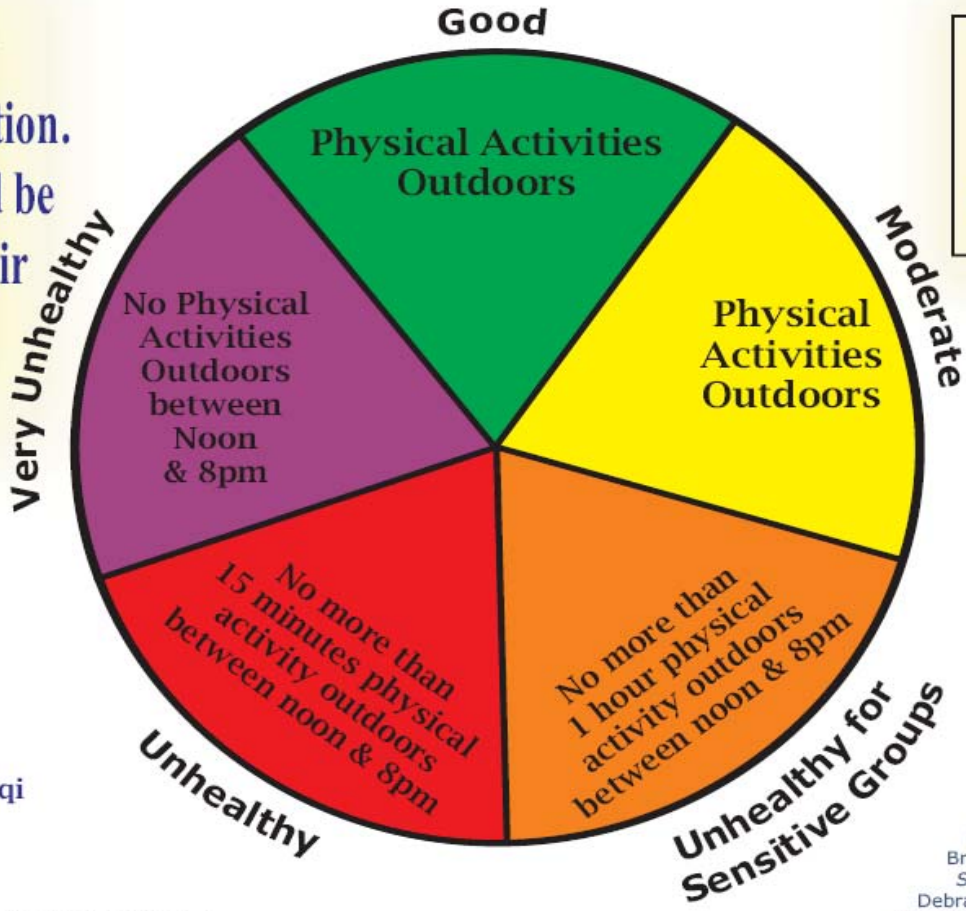
- Limit physical exertion outdoors.
- Consider changing the time of day of strenuous outdoor activity to avoid the period when air pollution levels are high or consider postponing sports activities to another time.
- Reduce the intensity of the activity, or spend less time engaged in strenuous activities. For example, coaches can rotate players more frequently in strenuous sports, like soccer. Resting players reduces their exposure to air pollution.

To learn more about and access the AQI, visit www.epa.gov/airnow.

Weather sensitivity

- Encourage parents of children who are sensitive to changes in weather and humidity, pollens, and environmental irritants (e.g., smog) to:
  - Monitor the daily local weather forecast.
  - Monitor pollen count and smog index.
  - Keep a relatively constant temperature and humidity in the house.
  - Keep windows closed and use air conditioning when pollen, smog, and humidity levels are high.

Children can be very sensitive to outdoor pollution. Physical activities should be limited when outdoor air quality is unhealthy.



Develop indoor physical activities for days with an Orange, Red or Purple Code Forecast.

Local Air Quality Forecast available at
www.daq.state.nc.us/monitor/aqi
or 1.888.AIR.WISE

Created by
Brandi Reynolds
Supervised by
Debra Yarbrough, R.S.
through partnerships with:
EAST CAROLINA UNIVERSITY
Craven County Health Department

In Compliance with: **SANITATION STANDARDS FOR CHILDCARE CENTERS**
15A NCAC 18A .2832 OUTDOOR LEARNING ENVIRONMENT AND PREMISES

Breathing Should Be Easy!

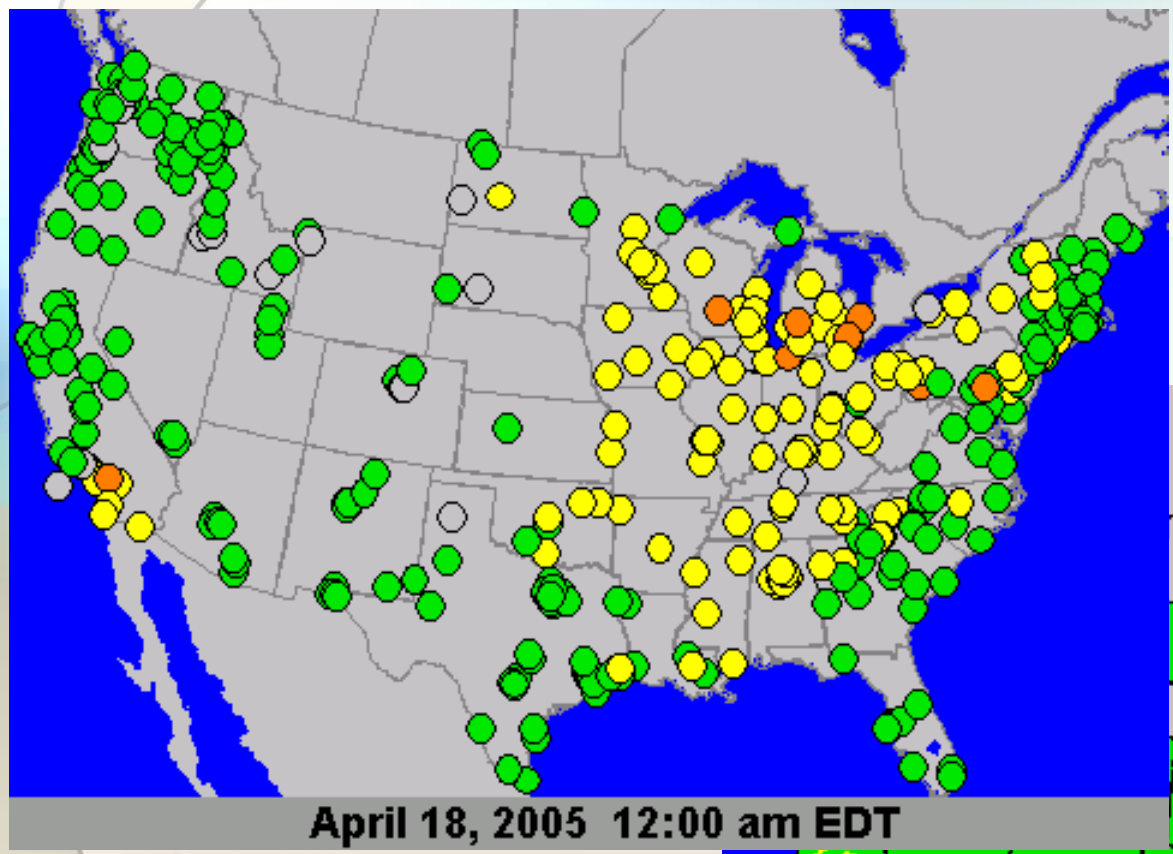
Craven-Pamlico Asthma Coalition (252) 636-4936

www.daq.state.nc.us/monitor/a

AIRNOW

Quality of Air Means Quality of Life

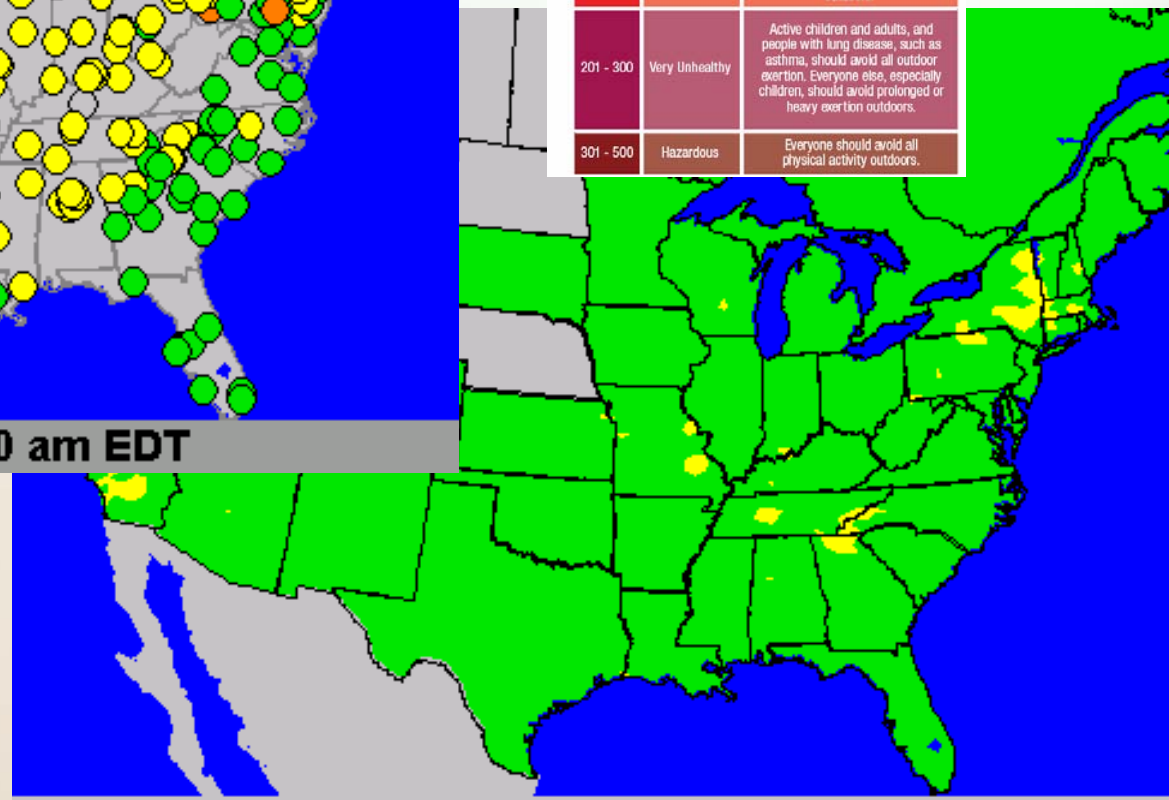
Home | National Forecast | Local Forecasts & Conditions | Partners



April 18, 2005 12:00 am EDT

Air Quality Index (AQI): Ozone

Index Values	Levels of Health Concern	Cautionary Statements
0 - 50	Good	None
51 - 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
101 - 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 - 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 - 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 - 500	Hazardous	Everyone should avoid all physical activity outdoors.



April 18, 2005 12:00 am EDT

Great Smoky Mtns. Natl. Park - NC

TODAY'S FORECAST
Tuesday, April 19, 2005

Primary Pollutant: Ozone

Health Message: Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.

TOMORROW'S FORECAST
Wednesday, April 20, 2005

Primary Pollutant: Ozone

Health Message: Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.

Ozone

The NC Division of Air Quality forecasts ozone for seven regions of North Carolina:

RALEIGH - DURHAM - CHAPEL HILL

WINSTON-SALEM - GREENSBORO - HIGH POINT

HICKORY - MORGANTON - LENOIR

FAYETTEVILLE

WILMINGTON

ASHEVILLE

GREENVILLE

http://daq.state.nc.us/airaware/forecast/

School Triggers

- Dust mites
- Chalk dust
- Animals
- Strong odors
- Exercise

Parental Awareness of Triggers

- 84% of the children did not have impermeable pillow covers
- 59% had furry pets
- 30% of households had a smoker
- 65% did not have mattress covers
- 64% were not washing sheets in hot water
- 78% had bedroom carpeting
- 48% of the households found mold or mildew in their home in the previous year

NC Asthma Plan – Environmental Strategic Plan

- Identify and reduce exposure to indoor asthma triggers
  - Partner with stakeholders with an interest in identifying and reducing asthma triggers (e.g. families, health, housing , education and the legal community)
  - Educate stakeholders about indoor asthma triggers (internet, local and state agency outreach, educational materials, continuing education

NC Asthma Plan – Environmental Strategic Plan

- Identify and reduce exposure to outdoor asthma triggers
  - Educate stakeholders about outdoor asthma triggers (internet, local and state agency outreach, educational materials, continuing education
  - Promote awareness of alternative actions to air pollution that may contribute to asthma
  - Promote awareness of the air quality index

NC Asthma Plan – Environmental Strategic Plan

- Explore correlations between environmental exposure and health impact
  - Identify and review scientific research studies relevant to the mission of AANC
  - Create and report summaries of scientific research studies biannually to the AANC
  - Promote enhancement of communication and dissemination between researchers and stakeholders

Resources

- Pediatric Asthma - Promoting Best Practice, American Academy of Allergy Asthma & Immunology, http://www.aaaai.org/members/resources/initiatives/pediatricasthma.stm
- Copyright notice: the information obtained from AAAAI is copyrighted: © Copyright 1996-2005 American Academy of Allergy, Asthma and Immunology. All rights reserved.
- http://pested.unl.edu/chapter1.htm#cock1a Pesticide Education Resources @ University of Nebraska-Lincoln .
- http:..envirohealth.berkely.edu/CYB/Basics.htm
- Http:..www.checnet.org/healthehouse/education/articles-detail-print.asp?Main_ID=445 Children's Health Environmental Coalition HealtheHouse

Resources

- **Introduction to Mold and Mold Remediation for Environmental and Public Health Professionals** http://www.epa.gov/mold/moldcourse/
- **Clinician's Guide on Moisture & Mold** http://oehc.uchc.edu/clinser/indoor.htm